ISSN 2564-3258

MINI REVIEW

Crossed Wires: Adult Ureteropelvic Junction Obstruction due to a Crossing Renal Artery

Oumaima Mesbah*, Siham El Msaadi, Ibtissam El Bqaq, Ola Messaoud, Zaynab Iraqi Houssaini, Laila Jroundi, Omar El Aoufir

Mesbah O, Msaadi SE, Ibtissam BE, et al. Crossed Wires: Adult Ureteropelvic Junction Obstruction due to a Crossing Renal Artery. Int J Radiol Case Rep. 2025;2(1):28-31.

Abstract

Objectives: To describe an uncommon presentation of adult Ureteropelvic Junction Obstruction (UPJO) caused by extrinsic compression from a crossing renal artery, and to highlight the critical role of contrast-enhanced imaging in its diagnosis and management.

Methods: We report the case of a 63-year-old male who presented with intermittent right-sided flank pain persisting for several months. Physical examination was unremarkable, but initial ultrasound revealed right-sided hydronephrosis without an apparent obstructive calculus. Further evaluation with contrast-enhanced Computed Tomography (CT) urography and CT angiography was performed to assess for structural or vascular causes of obstruction.

Results: CT imaging demonstrated significant right hydronephrosis with abrupt tapering at the ureteropelvic junction. A lower pole renal artery was identified coursing anterior to the UPJ, causing external compression consistent with vascular-induced obstruction. No intraluminal pathology was identified. Based on these findings, a diagnosis of adult UPJO secondary to a crossing vessel was made. The patient was referred for definitive surgical correction via pyeloplasty.

Conclusion: While UPJO is typically diagnosed in pediatric populations, it can present de novo in adults with non-specific symptoms. Vascular anomalies such as crossing renal arteries are rare but important causes. Advanced imaging techniques are essential for accurate diagnosis, differentiation from other pathologies, and guiding surgical planning to prevent long-term renal damage.

Key Words: *Ureteropelvic junction obstruction; Adult hydronephrosis; Crossing renal artery; CT angiography; Vascular compression*

Emergency Radiology Department, Ibn Sina University Hospital, Faculty of Medicine and Pharmacy of Rabat, Mohamed V University, Rabat, Morocco

**Corresponding author: Oumaima Mesbah, Resident Doctor, Emergency Radiology Department, Ibn Sina University Hospital, Faculty of Medicine and Pharmacy of Rabat, Mohamed V University, Rabat, Morocco, E-mail: oumaima.mesbah@gmail.com*

Received: May 21, 2025, Accepted: May 28, 2025, Published: June 05, 2025

OPEN ACCESS This open-access article is distributed under the terms of the Creative Commons Attribution Non-Commercial License (CC BY-NC) (http://creativecommons.org/licenses/by-nc/4.0/), which permits reuse, distribution and reproduction of the article, provided that the original work is properly cited and the reuse is restricted to noncommercial purposes.

Introduction

Ureteropelvic Junction Obstruction (UPJO) is a recognized cause of hydronephrosis and progressive renal impairment. It is most commonly a congenital anomaly diagnosed during infancy or early childhood [1]. Congenital UPJO arises from intrinsic narrowing or muscular disorganization of the UPJ, whereas acquired or adult-onset UPJO typically results from extrinsic factors such as aberrant crossing vessels [2–5]. However, UPJO can also present in adulthood, often as a result of extrinsic compression from aberrant blood vessels, especially a crossing lower pole renal artery [2–5].

Adult-onset UPJO is frequently underdiagnosed due to its insidious progression and nonspecific symptoms such as flank pain, recurrent urinary tract infections, or nephrolithiasis [3-6]. In such cases, imaging becomes vital for diagnosis. While ultrasound can suggest hydronephrosis, it is limited in identifying the underlying cause. Contrast-enhanced CT Urography (CTU) and CT Angiography (CTA) are considered gold-standard imaging modalities, capable of delineating the anatomical relationship between renal vasculature and the ureteropelvic junction [7,8]. Functional imaging, such as diuretic renography (e.g., MAG3), is also critical in assessing differential renal function and confirming the presence of an obstructive pattern prior to surgical intervention [9]. This case report describes a 63-year-old male with UPJO secondary to a crossing vessel and emphasizes the importance of considering vascular anomalies in adult-onset obstructive uropathies.

Case Study

A 63-year-old male with no known past urological or surgical history presented with a 6-month history of intermittent right flank pain, aggravated by physical exertion and high fluid intake. He denied hematuria, dysuria, or lower urinary tract symptoms. There was no history of urinary tract infections, nephrolithiasis, or trauma.

On physical examination, the patient was afebrile, hemodynamically stable, and had mild right costovertebral angle tenderness. Laboratory tests including serum creatinine, urinalysis, and urine culture were within normal limits.

Initial renal ultrasound demonstrated moderate right-sided hydronephrosis without evidence of calculi. To further investigate, contrast-enhanced CT urography was performed, revealing significant dilation of the right renal pelvis with abrupt narrowing at the ureteropelvic junction (Figure 1).

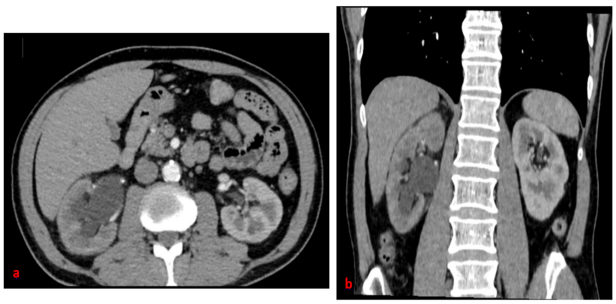

Figure 1) *Contrast-enhanced CT urography (axial and coronal views) showing right-sided hydronephrosis with abrupt narrowing at the ureteropelvic junction.*

A CT angiogram, in the arterial phase, demonstrated an aberrant right lower pole artery crossing anterior to the UPJ and compressing the ureter (Figure 2), confirming the diagnosis of extrinsic UPJO due to a crossing vessel.

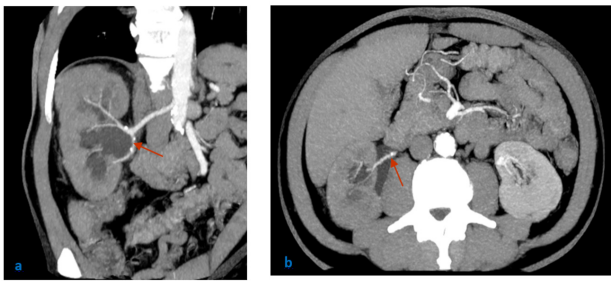

Figure 2) *CT angiography (coronal and axial views) demonstrating an aberrant lower pole renal artery crossing anterior to the ureteropelvic junction and causing compression.*

Discussion

While congenital UPJO is typically diagnosed in early life, adult-onset UPJO, often from extrinsic compression, is increasingly recognized [2,4,5]. Aberrant lower pole renal arteries are the most common extrinsic culprits, contributing to 10–15% of UPJO cases in adults [3,4].

During embryological development, kidneys ascend and are supplied by multiple transient arteries, some of which may persist as accessory renal arteries. When these arteries cross anterior to the UPJ, they can cause intermittent or persistent ureteral obstruction [2,5,9].

Symptoms in adults are often nonspecific. Intermittent flank pain—worsened by fluid intake or exertion—is the most common presentation [3-6]. Associated findings can include hematuria, recurrent urinary tract infections from impaired drainage, nephrolithiasis due to urinary stasis, and occasionally hypertension due to altered renal perfusion and activation of the renin-angiotensin-aldosterone system [6-10].

Imaging plays a central role in diagnosis. Renal ultrasound is usually the first investigation, capable of identifying hydronephrosis but not the cause of obstruction [7]. CT urography and CTA provide detailed anatomic mapping, allowing identification of crossing vessels and assessment of renal function [8-11]. However, these anatomic studies should be complemented by functional imaging. Diuretic renography (e.g., MAG3) is essential in assessing both the degree of obstruction and split renal function, which guides surgical planning and prognosis [12].

Surgical correction is the definitive treatment. Dismembered pyeloplasty is the gold standard, allowing repositioning of the ureter to avoid the crossing vessel while preserving renal function [13,14]. Alternatives include the vascular hitch (Hellström procedure), though its use is typically limited to select cases where the vessel can be mobilized without tension [14]. When renal function is severely compromised, nephrectomy may be indicated [15].

In this case, the patient underwent laparoscopic dismembered pyeloplasty. The crossing vessel was preserved and the ureter was re-anastomosed anterior to it. Postoperative recovery was uneventful. At 3-month follow-up, the patient reported complete resolution of flank pain. Repeat ultrasound showed resolution of hydronephrosis, and a follow-up MAG3 scan demonstrated improved drainage and preserved renal function (right kidney function 44%).

Timely intervention is crucial, as untreated UPJO can lead to worsening hydronephrosis, chronic infections, nephrolithiasis, hypertension, and eventual renal failure [10-15].

Conclusion

Adult-onset ureteropelvic junction obstruction caused by crossing renal vessels is a rare but significant cause of flank pain and hydronephrosis. High clinical suspicion, especially in the absence of typical urinary tract symptoms, and appropriate imaging are essential for accurate diagnosis. CT urography and angiography are invaluable tools for identifying vascular anomalies. Complementary functional imaging with diuretic renography is essential for confirming obstruction and planning surgical intervention. Prompt surgical intervention is necessary to preserve renal function and prevent long-term complications.

References

1. Brown JM, Taylor J, Singh R, et al. Ureteropelvic junction obstruction in adults. J Urol. 2010;183:1582–8.

2. Rojas C, Kirsch AJ. Vascular anomalies causing ureteropelvic junction obstruction. Curr Urol Rep. 2021;22:47.

3. Msezane LP, Bagley DH. Ureteropelvic junction obstruction. Curr Opin Urol. 2009;19:149–53.

4. Psooy K, Pike JG, Leonard MP. The significance of crossing vessels in pediatric ureteropelvic junction obstruction. J Urol. 2003;169:1066–9.

5. Coleman R, Smith G. Adult ureteropelvic junction obstruction: a review of contemporary management. Urol. 2014;84:254–9.

6. Harraz AM, Mosharafa AA, Sameh W, et al. Adult ureteropelvic junction obstruction: is it really an 'acquired' disease? Int Urol Nephrol. 2015;47:1667–71.

7. Ziegler T, Ahmed M, Nolan R, et al. Ureteropelvic junction obstruction in adults: diagnostic approach. J Endourol. 2012;26:1257–63.

8. Schuster TG, Patel V, Brown R, et al. Role of CT angiography in the diagnosis of crossing vessels in UPJ obstruction. Urol. 2006;68:1185–9.

9. Schmidbauer J, Meier A, Riedl C, et al. Embryology of the renal vasculature and implications for UPJ obstruction. Urol Clin North Am. 2005;32:309–18.

10. Riccabona M, Damasio F, Michel-Behnke I, et al. Complications of ureteropelvic junction obstruction. Pediatr Nephrol. 2012;27:1817–24.

11. Zargoosh M, Taghavi R, Farrokhi F, et al. CT angiography in the diagnosis of crossing vessels causing UPJ obstruction. J Urol. 2007;177:1427–31.

12. Kotkin L, Phelps A, Simmons M, et al. Flank pain and the incidence of adult UPJ obstruction. J Urol. 2016;195:1260–4.

13. Thompson A, Martinez D, Warner K, et al. Pyeloplasty in adults with crossing vessels: outcomes and challenges. Urol Clin North Am. 2009;36:551–60.

14. Patel M, Sanchez R, Tucker J, et al. Management of adult UPJ obstruction with vascular anomaly. Urol. 2008;72:1005–10.

15. Tullus K, Sharma V, Coulthard M, et al. Long-term complications of untreated ureteropelvic junction obstruction. Urol Int. 2006;77:125–30.